REMARKS

This reply encompasses a bona fide attempt to overcome the rejections raised by the Examiner and presents amendments as well as reasons why the applicants believe that the claimed invention is novel and unobvious over the closest prior art of record, thereby placing the present application in a condition for allowance.

Regarding Claim Status

Claims 1-3, 6-10, and 20-22 were pending. Claims 1-3, 6-8, 10, 20, and 22 were rejected. Claims 1-3 and 6 are cancelled herein, rendering the rejections with respect to these claims moot. Claims 7-8, 20, and 22 are particularly amended herein to overcome the rejections and are therefore respectfully submitted to be allowable. Claim 22 was also objected and is amended herein to obviate this objection.

Claim 9 was objected to as being dependent upon a rejected base claim, but has been indicated as would be allowable if rewritten in independent form including all of the limitations of the base claim. The Applicants thank the Examiner for pointing out the allowable subject matter. Claim 9 is accordingly rewritten in independent form including all of the limitations of the base claim 7. There were no intervening claims. Claim 9 is therefore submitted to be allowable.

Claim 21 has been allowed. By this Amendment, claims 7-10 and 20-22 are pending.

Regarding 35 U.S.C. § 102(b) Rejections

Claims 7-8, 10, 20, and 22 were rejected under 35 U.S.C. § 102(b) as being anticipated by Weihe (U.S. Patent No. 2,221,418). Claims 7-8, 10, 20, and 22 were also rejected under 35 U.S.C. § 102(b) as being anticipated by Smith *et al.* (U.S. Patent No. 5,407,912, hereinafter referred to as "Smith").

It is respectfully submitted that claims 7-8, 10, 20, and 22, as amended, are distinguishable from Weihe and Smith, individually and in combination, and therefore should be allowed. The rationale submitted below for allowing the amended independent claim 7 also applies to the amended independent claim 20.

Weihe describes condensation products of equimolar amounts of various (polythio)dialkylglycols with dicarboxylic acids (succinic, adipic, phthalic, polyacrylic, etc.) and their anhydrides [col. 2, line 2]. However, Weihe does not teach that these reactions take place in the presence of a catalyst that allows the formation of ester groups in the conditions described therein.

Smith describes specific products resulting from the compositions that contain <u>all</u> of the following components

a) curing initiator (photoinitiator or peroxide), and

b) reaction product of dihydroxyethyldisulfide with photocurable unsaturated acids (maleic, fumaric and itaconic acids and their anhydrides).

Smith mentions that certain amounts of monofunctional unsaturated acids or their anhydrides (such as methacrylic acid and methacrylic anhydride), and some amount of saturated (succinic or adipic) acids can be included into the reaction mixture. In addition, Smith mentions that amounts of hydroquinone and/or triethylamine can be added to the reaction mixture catalytic [col. 8, line 25].

Weihe and Smith, individually and in combination, do not teach or describe any composition of the formulae containing (polythio)esters as set forth in the amended claim 7. In fact, as further explained below, the substances obtained by Weihe or Smith (in their respective prescribed conditions) have quite a different structure.

a) **In the case of a reaction between a (polythio)diethylglycol and a dicarbonic acid.**

Weihe teaches that if an equimolar mixture of these products without any catalysts is heated to 110-250°C for 2-8 hours (time estimated from the other examples in Weihe), some "yellow or brown, viscous to solid mass" will be formed [col. 2, lines 7-8].

Smith teaches that 1 mol of dithiodiethylglycol is mixed with 0.64 mols of succinic acid at 82-93°C in the presence of triethylamine and/or hydroquinone, and then 0.7 mols of methacrylic acid are added to the reaction mixture at 104°C [Example 1]. Smith does not teach the time that the reaction mixture is kept at this temperature.

As neither Weihe, nor Smith mention that they are conducting the reaction under vacuum,

neutral gas blanket, or other specific conditions, it is reasonable to assume that the reagents would have access to oxygen in the air, which has at least two implications.

i. The first reaction that will take place in the reaction mixture is self-polycondensation of (polythio)diethylglycols with formation of polythioethers:

$$n\ HO\text{-}(CH_2)_2\text{-}S_x\text{-}(CH_2)_2\text{-}OH \rightarrow [\text{-}O\text{-}(CH_2)_2\text{-}S_x\text{-}(CH_2)_2\text{-}]_n + n\ H_2O$$

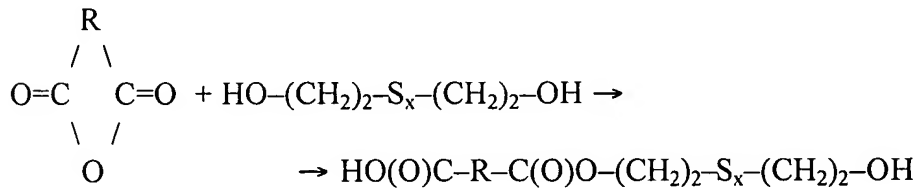
This reaction is well examined, and (polythio)diglycols under the above described conditions participate in it quite readily (Andrews *et al.*, Journal of Polymer Science, Volume XLI, pp 231-239 (1959); Richter *et. al.*, US Patent No. 2,582,605).

Except under the specific conditions described in the present application, the rate of hydroxyl/carboxyl interaction is insignificant. Under other conditions, the reaction leading to the formation of polythioethers would proceed readily in the neural and even slightly caustic pH, resulting in the formation of extremely viscous, semi-solid or solid resinous brown polythioethers [*see, e.g.,* Weihe, col. 2, lines 7-8] .

ii. The second is the group of reactions resulting in gumming and resinification of the reaction mixture. (Polythio)diethylglicols are reactive oxidizable compounds, and at such temperatures in the presence of oxygen they oxidize with the formation of dark resinous tar (Sreshenko, High Molecular Weight Oils, Moscow, 1964; Gun, Oil Bitumens, Moscow, 1980). These reactions will undergo even more readily if the acid was unsaturated (such as maleic, fumaric or itaconic).

b) **In the case of a reaction between (polythio)diethyleneglycol and dicarbonic anhydride.**

In this case, one more reaction is added to the reaction described in the case (a). It is the reaction between an anhydride and hydroxyls of the (polythio)diethylglycols.



As the components are taken in **equimolar** amounts [Weihe, col. 2, line 2], there is practically **zero probability** that, alongside with the products discussed above, any of the bi-substituted products could have a structure identical or similar to the compounds described in the amended claim 7. This reaction would have proceeded very actively under the prescribed conditions of Weihe. Moreover, Weihe lacks a defined chemical formula for the "insoluble balsam" [col. 2, line 51].

The amended claim 7 specifically distinguishes Smith by including only compounds that contain in their molecular structure a minimum of two segments produced by the dihydroxyethyldisulfide, and a minimum of three segments produced by a dibasic acid or its anhydride.

In summary, Weihe describes the formation of certain solid and semi-solid "balsams" with unknown chemical composition. Nowhere does Weihe teach or describe these "balsams" having a chemical formula that is identical or similar to the ones taught and claimed in the present application. At the conditions of the synthesis described by Weihe, the chemical composition of these balsams would have been absolutely different from the compounds taught and claimed in the present application.

Conclusion

For the foregoing reasons, it is respectfully submitted that the invention as set forth in the amended independent claims 7 and 20 recites subject matter not reached by Weihe and Smith, respectively, under 35 U.S.C. § 102(b). Accordingly, claims 7 and 20 are submitted to be patentable and therefore should be allowed. Reliance is placed on *In re* Fine, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988) and *Ex parte* Kochan, 131 USPQ 204 (Bd. App. 1960) for allowance of the dependent claims 8, 10, and 22. Claims 9 and 21 have been indicated as would be allowable.

This Reply is submitted to be complete and proper in that it places the present application in a condition for allowance without adding new matters. Since the Examiner has done a thorough search in view of the entire application disclosure and cited the best references at his command under 37 CFR 1.104, no new search should be necessary. Favorable consideration and a Notice of Allowance of all pending claims 7-10 and 20-22 are therefore earnestly solicited.

The Examiner is sincerely invited to telephone the undersigned at 650-331-8413 for discussing an Examiner's Amendment or any suggested actions for accelerating prosecution and moving the present application to allowance.

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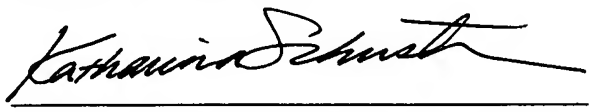
Respectfully submitted,



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